REMARKS

Claims 1-13 are pending in the application on the basis of a preliminary Amendment filed on February 3, 2004. A review of public PAIR indicates that this amendment has been entered into the USPTO filewrapper. Nonetheless, the Examiner states that only claims 1-9 are pending in the application. If all of claims 1-13 are not found allowable, Applicant respectfully requests that any next Office Action that involves a rejection of any one or more of claims 10-13 should not be made final.

With regard to claims 1-9, the Examiner rejects claims 1-3 and 7-9. The Examiner states that claims 4 and 5 are objected to and would be allowable if placed into independent form. Applicants have amended claim 4 to place it into independent form, thereby clearly rendering claims 10 and 12 allowable. Since the Examiner considers original claim 5 to be allowable, even though it depends from either claim 3 or claim 4, the Examiner must consider the subject matter of claim 5 with dependency from claim 3 to be allowable. Thus, Applicant also has placed claim 5 into independent form, thereby rendering claims 11 and 13 allowable.

Applicant has amended claims 1, 2, 7 and 8 to further clarify the invention. Finally, Applicant has added new claims 14 and 15, which are based on amended claim 7, to round out the scope of protection to which Applicants are entitled.

Claim Objections

Claims 4 and 5 are objected to because they depend from a rejected parent claim. These claims have been placed into independent form.

Claim 6 is objected to as being in improper form. The Examiner asserts that it is a multiple dependent claim that depends from a multiple dependent claim. This objection is traversed because claim 6 previously was amended to depend only from claim 2 in the Preliminary Amendment submitted on February 3, 2004. Thus, there is no basis for objecting to this claim.

Claim Rejections - 35 U.S.C. § 102

Claims 1-3 and 7-9 are rejected under 35 U.S.C. § 102(b) as being anticipated by Peercy et al (Efficient Bump Mapping Hardware; 1997 ACM). . This rejection is traversed for at least the following reasons.

As a preliminary matter, Applicant notes that the invention concerns image processing for purposes of creating a display on a game machine for home use. As explained at page 7, the control portion 11 in Fig. 1 allows play of the game based on information on a three-dimensional object disposed in a three-dimensional space and information on one or more light sources. The object information concerns the position and color of polygons, which are conventionally applied to create an image in game display technology. The light source information concerns position, intensity and color, etc. The drawing portion 12 in Fig. 1 performs edge processing in which shapes of irregularities are assigned to edge portions of the three-dimensional object.

A specific goal of the invention is to process the three-dimensional object for "unsteadiness representation" using "unsteadiness processing" as explained with regard to Fig. 2. As explained at pages 15 and 16, such processing allows an edge portion to look deformed, e.g., giving the impression of a character breathing or a window flexibly deforming, by a "defocusing processing" on the display image data.

Specifically, with reference to the subsystem illustrated in Fig. 2, display image data, comprising a two-dimensional array of pixels, is stored in storage 25 for display on display portion 13. However, for unsteady processing, image generating portion 21 selects each of the pixels in a predetermined sequence and determines the color for that particular pixel in the correct sequence based on information on the three-dimensional object and information on the given viewpoint position, as explained at pages 10 and 11 with regard to Fig. 3. The information on each pixel includes a Z-value, representing a distance between a position on the three-dimensional object and the viewing position.

The display image generating portion 21 generates information on the area in which the object for unsteadiness processing is drawn, specifically the position in the image area of a group of pixels that will receive unsteadiness processing among all of the pixels. The color of each

pixel is based on an original texture map image data to be applied to the surface of each three-dimensional object originally stored.

An elemental image generating portion 22 generates image data (elemental image data) that draws at least one figure ("elemental image"), at least part of which overlaps another, inside the image area corresponding to the surface of the object for unsteadiness processing. The color of the figure may be adjusted based on the original texture map image data. The position at which the elemental image is drawn may be near an edge portion of the area represented by the image data identification data.

An image synthesizing portion 23 receives the input from the display image generating portion 21 and elemental image generating portion 22 and blends the data, preferably using α-blending (translucent synthesizing) based on an α-value map included in the original texture map image data.

Finally, an image processing portion 24 performs "defocusing processing" at least locally for the display image data after synthesizing by synthesizing portion 23. The defocusing processing may be applied with a two-dimensional Gaussian filter. The defocusing processing corrects colors of pixels surrounding a central pixel included in an area identified by the image area identification data of the synthesized display image data. Thus, the defocusing processing affects colors of pixels beyond the area identified by the image area identification data. This allows an outline of the object for unsteadiness processing to swell or dent, thus representing an unsteady state, as explained at page 13. The decision on whether or not to make a correction may be based upon the Z value of a pixel, as explained at pages 13 and 14.

An explanation of the processing is provided with regard to Fig. 4 at pages 14-16. As noted with respect to Fig. 4(f), the application of the defocusing processing on the display image data that has been synthesized will blur an outline of the original texture map image data and the elemental image on the synthesized display image data so that a boundary between the two images is inconspicuous, making the outline unsteady. The edge portion looks deformed and may even vary randomly with time based on the generation of image data for defocusing or changes to the defocusing parameter.

Claim 1

The image generating apparatus of independent claim 1 recites the invention generally, with regard to the structures of Fig. 1. The apparatus has an image area identification data storage means (corresponding to 14) for storing image area identification data that, of said display image data, specifically identifies an image area corresponding to said three-dimensional object. Also, the apparatus has an image processor means (corresponding to 11, 12) for applying image defocusing processing at least locally to said display image data based on said image area identification data.

Applicant has amended the claim to limit the defocusing processing to a part of the display image data representing an edge of said three-dimensional object. Applicant respectfully submits that the change clearly distinguishes over the bump processing disclosed in the prior art.

Claim 2

The image generating apparatus of independent claim 2 recites the invention more specifically, with regard to the structures of Fig 2. The claim is similar to claim 1, except it does not recite the storage and includes an elemental image generating means (corresponding to 22) for generating elemental image data that is applied to a surface forming a three-dimensional object and that draws at least one elemental image in an image area corresponding to a surface forming the three-dimensional object. It also has a synthesizing means (corresponding to 23) for generating synthesized display image data to be displayed on the screen by synthesizing the generated elemental image data with the display image data generated based on the information on the three-dimensional object. Finally, there is an image processing means (corresponding to 24) that applies image defocusing processing to the synthesized data.

Applicant has amended the claim in a manner similar to claim 1 and expressly states the "elemental image data" represents at least one figure.

Claims 7 and 8

Independent claim 7 relates to an image generating method that closely tracks claim 1. Independent claim 8 relates to a storage product for a computer program that controls a computer and contains the steps of claim 7.

Applicant has amended claims 7 and 8 in the same manner as claim 1.

Claims 14 and 15

Applicant has added method claim 14 and computer product claim 15, which will correspond to claim 2, as amended.

Peercy et al

The Examiner asserts that Peercy et al teaches the three-dimensional graphics applications of claim 1 at section 4, with computing directly in eye space (viewpoint position). The storing of image area identification data that identifies an image area corresponding to the three-dimensional object is asserted to be taught in Section 2, where storing a "three component texture map" is found. Finally, the image processing means of claim 1 is asserted to be taught at the introduction with respect to teachings of interpolation of polygon vertices to polygon interiors, and at Section 2, where there also is a teaching of interpolation in the polygonal interiors, the polygons interiors corresponding to the claimed image area. The smoothing generated by interpolation is asserted to correspond to the claimed defocusing.

With regard to the subject matter of claim 2, which corresponds to Applicant's Fig. 2, the Examiner asserts that Peercy et al teaches a display image generating means as in claim 1 and elemental image generating means with regard to the bump mapping processing in the reference. The synthesizing means is asserted to be disclosed in the introduction with regard to the teachings of using bump mapping as the synthesizing means. Finally, the Examiner asserts that image processing means for applying image defocusing to the synthesized display image data, as interpolation, is shown in Fig. 2.

With regard to claim 3, the Examiner asserts that the storage means for storing texture map data to be applied to the surface forming the three-dimensional object is found in Peercy as a texture map, and the display image generating means is taught as the information read from the texture map.

Bump Mapping Previously Distinguished

Initially, it should be noted that Applicants distinguished bump mapping processing of the type taught by Peercy et al at pages 1 and 2 of the present application. As described there,

information on a normal direction at each of different positions on the polygon forming surface is adjusted so as to vary the direction in which light is reflected, thereby making the polygon forming surface look as if there are irregularities formed thereon. In bump mapping, the actual shape of the polygon is not altered though the polygon forming surface looks as if there are irregularities formed thereon. Thus, no shapes of irregularities occur on the edges of the polygon.

Peercy follows this teaching and, clearly, does not teach any formation of irregularities on the edges of a polygon. Thus, the amendment to claim 1 further distinguish Peercy from the claimed invention. The claim amendment would now specifically state that the image processing means applies image defocusing processing at least locally to said display image data that represents an edge of said three-dimensional object.

A similar amendment has been made to claim 2. In addition, Applicant defined the elemental image data as representing "at least one figure," as noted earlier. This again is consistent with the teachings in the application.

On the basis of the amendments made to claims 1 and 2, these claims and the claims dependent thereon are patentable.

With regard to claims 7 and 8, these claims are patentable for the reasons given with respect to claim 1, since the same amendment would be made.

Claim Rejections – 35 USC 101

Claim 8 is rejected under 35 USC 101 as being directed to non-statutory subject matter, namely, a computer program. This rejection is traversed for at least the following reasons.

The claim is directed to a program product, which is statutory subject matter under applicable law. Specifically, the claim is directed to "a computer-readable medium for use in a computer and storing a program for executing [a specific program]. This has been held to be statutory subject matter for over ten years under the Federal Circuit decision of *In re Beauregard*. However, if the Examiner has alternative language in mind, a call to the undersigned is respectfully requested so that the language can be discussed.

Allowable Subject Matter

Claims 4 and 5 are considered to be allowable. As demonstrated above, on the basis of the amendments to the claims, claims 4, 5, 10, 12 and 13 clearly are patentable. In addition, claims 1-3, 6-9 and 11 also should be patentable. Finally, new claims 14 and 15 would be patentable

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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